## REMARKS

In the Non-Final Office Action of August 25, 2004, claims 1-13 are pending. Claims 1, 10-11, and 13 are independent claims from which all other claims depend therefrom.

Claims 1-2 and 7-8 stand rejected under 35 U.S.C. 102(e) as being anticipated by Whight (US Publication No. 2001/0038670 A1).

The Office Action states that the Whight teaches a method of digitally canceling interference on a received signal including adaptively canceling interference on the received signal using an interference reference feedback signal and refers to Figure 2, page 2 section [0037] for such teaching. Applicants, respectfully, traverse. Note that the circuit of Figure 2 of Whight is similar to the admitted prior art circuit of Figure 1 of the present application.

Applicants submit that Whight, as with the admitted prior art, does not teach any of the elements of claim 1, namely, digitally canceling interference, digitally canceling interference on a received signal, performing the stated tasks within a satellite payload, and adaptively canceling interference on the received signal using an interference reference feedback signal.

Whight receives an analog or input signal 131 and an interference reference signal 135. A small portion or sampling of the output or desired signal, referred to as an error signal 159, is compared with the interference reference signal 135 to generate a control signal 157, which is similar to the error signal 26 of the admitted prior art. In other words, the error signal 159 is the same as the desired signal of Whight, but is small in magnitude. A counter-interference signal is generated in response to the interference reference signal 135 and the control signal 157. The error signal 159, which is a small portion of the desired signal, is the only feedback signal shown and described. The error signal is not an interference reference signal or an interference reference feedback signal. Whight, as with the admitted prior art, uses the interference reference signal 135, from a second source, as the interference reference signal. Whight does not use the error signal 159 as the interference reference signal, but rather uses the error signal 159 to compare the desired signal to the interference reference signal 135.

Nowhere in Figure 2, paragraph [0037] or for that matter anywhere else in Whight is the digital cancellation of interference mentioned, taught, or suggested. Whight states that the circuit of Figure 2 is the preferred method of performing interference cancellation. The method of interference cancellation of Figure 2 is analog based.

In order for a reference to anticipate a claim the reference must teach or suggest each and every element of that claim, see MPEP 2131 and *Verdegrad Bros. V. Union Oil Co. of California*, 814 F.2d 628. Thus, since each and every element of claim 1 is not taught or suggested by Whight, Applicants submit that claim 1 is novel, nonobvious, and is in a condition for allowance. Applicants submit that since claims 2 and 7-8 depend from claim 1, they are also novel, nonobvious, and are in a condition for allowance for at least the same reasons.

With regards to claims 7 and 8, the Office Action states that Whight teaches digitally and accurately replicating the interference and digitally canceling interference on a plurality of signals, and refers to Figure 1, page 2 section [0040] of Whight for such teachings. Again, Applicants submit that nowhere in Whight is digital cancellation of interference mentioned, taught, or suggested. Nowhere in Whight is the term "digital" used, nor are any digital circuit elements used, shown, or mentioned. Also, Figure 1 and paragraph [0040] of Whight do not disclose the digital canceling of interference on multiple received signals. Figure 1 simply discloses three sectors of analog polarized electromagnetic signals being transmitted and received. Paragraph [0040] describes the circuit of Figure 2 for analog interference cancellation for a single received communication signal, as described above.

Claim 9 stands rejected under 35 U.S.C. 103(a) as being unpatentable over Whight in view of Ushirokawa (USPN 6,535,554).

Applicants submit that since claim 9 depends from claim 1 that claim 9 is also novel, nonobvious, and is in a condition for allowance for at least the same reasons as put forth above with respect to claim 1.

Also, Ushirokawa, as with Whight, fails to teach or suggest digitally canceling interference on a received signal within a satellite payload including

adaptively canceling interference on the received signal using an interference reference feedback signal. Referring to MPEP 706.02(j) and 2143, to establish a *prima facie* case of obviousness the prior art references must teach or suggest all the claim limitations. Since Whight and Ushirokawa alone or in combination fail to teach or suggest each and every element of claim 9, claim 9 is novel, nonobvious, and is in a condition for allowance.

Claims 3-6 and 10-12 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Whight in view of Cioffi et al. (USPN 5,995,567).

Applicants submit that since claims 3-6 depend from claim 1 that claims 3-6 are also novel, nonobvious, and are in a condition for allowance for at least the same reasons as put forth above with respect to claim 1.

Cioffi discloses a radio frequency noise canceller for a ground based communication system. The noise canceller includes, as is shown in Figure 6, a pair of analog to digital converters (ADC), a subtractor, and a digital signal processor (DSP). A differential signal $v_d$ is received by a first ADC 604 and a common mode signal or reference noise signal $v_c$ is received by a second ADC 510. A digital noise signal $v_n$ is subtracted from the difference signal to form a noise-cancelled difference signal or desired signal $v_{fD}$. The DSP generates a digital noise signal $v_n$ in response to the reference noise signal $v_c$ and the desired signal $v_{fD}$. Note that the reference noise signal, like the interference reference signal of the admitted prior art, is not a feedback signal and is not generated from the circuitry or components of the canceller.

With regards to claim 3, the Office Action states that Whight fails to teach digitally processing a desired signal to generate a feedback reference interference signal. Applicants agree. However, the Office Action states that Cioffi teaches such generation and refers to Figure 6, col. 11, lines 43-62. Applicants traverse. The desired signal $v_{fD}$ of Cioffi is digitally processed in combination with the interference reference signal $v_c$ to generate the digital noise signal $v_n$. The desired signal $v_{fD}$ of Cioffi is not digitally processed to generate the interference reference signal $v_c$, this is clear in review of Figure 6, lines 43-62.

With regards to claim 4, the Office Action states that Whight teaches correlating an interference reference feedback signal to a desired signal to generate an error signal. Applicants submit that Whight correlates a non-feedback interference reference signal with an error or desired signal to generate a control signal.

Claim 10 recites a method of digitally canceling interference on a received signal within a satellite payload. The method includes receiving a communication signal having interference. The communication signal is converted into the received signal. A counter-interference signal is subtracted from the received signal to form a desired signal. The desired signal is digitally processed to form an interference reference feedback signal. The interference reference feedback signal is correlated to the desired signal to generate an error signal. Interference on the received signal is adaptively canceled based on the error signal by generation of the counter-interference signal to cancel the interference.

The Office Action states that Cioffi teaches digitally processing a desired signal to form an interference reference feedback signal, in so doing the Office Action refers to the desired signal $v_{fD}$ of Cioffi as the interference reference feedback signal. As stated above, the desired signal $v_{fD}$ of Cioffi is not an interference reference signal or an interference reference feedback signal, but is rather used in conjunction with a interference reference signal $v_c$ to form a digital noise or interference signal $v_n$. The desired signal $v_{fD}$ does not form the interference reference signal $v_c$. Nowhere in Cioffi is an interference reference feedback signal utilized.

Claim 11 recites a satellite communication system. The communication system includes an antenna that receives a communication signal. An ADC converts the communication signal into a received signal. A satellite payload circuit having a first input, a second input, and an output, is coupled to the ADC via the first input. The satellite payload circuit digitally processes the received signal to form an interference reference feedback signal. A feedback signal path couples the output to the second input. The feedback signal path transfers the interference reference feedback signal from the output to the second input.

The Office Action states that Whight discloses a feedback signal path that electrically couples an output to a second input 135 and transferring of an interference reference feedback signal 155 from the output to the second input 135. Applicants traverse. The output of Wright is coupled to a correlator 153. The output or desired signal path transfers the desired signal to the correlator. The desired signal path does not transfer the desired signal to the second input, wherein the interference reference signal 135 is received.

The Office Action further states that Whight fails to teach a satellite payload circuit digitally processing said received signal to form an interference reference feedback signal and relies on Cioffi for such teaching. As stated above both Whight and Cioffi fail to teach or suggest this claimed limitation.

Thus, Whight and Cioffi alone or in combination fail to teach or suggest each and every element of claims 3, 10, and 11, thus claims 2, 10, and 11 are also novel, nonobvious, and are in a condition for allowance. Since claims 4-6 and 12 depend from claims 3 and 11, respectfully, they are also novel, nonobvious, and are in a condition for allowance for at least the same reasons.

Claim 13 stands rejected under 35 U.S.C. 103(a) as being unpatentable over Whight in view of Cioffi.

Claim 13 recites a communication system. The system includes an antenna receiving a communication signal. An ADC converts the communication signal into a received signal. A subtractor subtracts a counter-interference signal from the received signal to form a desired signal. A digital processor generates an interference reference feedback signal from the desired signal. A correlator compares the interference reference feedback signal to the desired signal to generate an error signal. A controller adaptively cancels interference on the received signal based on the error signal.

The Office Action states that White fails to teach: an ADC coupled to an antenna, the ADC converting the communication signal into a received signal; a subtractor coupled to the ADC and subtracting a counter interference signal from a received signal to form a desired signal; and a digital processor coupled to a subtractor, the processor generating an interference reference feedback signal from

a desired signal. Applicants agree. However, the Office Action states that Cioffi provides such teaching. Applicants again traverse. The Office Action states that Cioffi teaches a digital processor 506 generating an interference reference feed back signal 512. Applicants again submit that the digital processor 506 generates an estimated noise signal or interference signal $v_n$. The noise signal $v_n$ is not a feedback signal or an interference reference signal, and the digital processor 506 does not generate a feedback signal or an interference reference signal. The digital processor 506 receives the desired signal $v_{fD}$ and a separate interference reference signal $v_c$ and generates the noise signal $v_n$ therefrom. Thus, Whight and Cioffi alone or in combination fail to teach or suggest each and every limitation of claim 13, therefore, claim 13 is also novel, nonobvious, and is in a condition for allowance.

In light of the remarks, Applicants submit that all objections and rejections are now overcome. The application is now in condition for allowance and expeditious notice thereof is earnestly solicited. Should the Examiner have any questions or comments, he is respectfully requested to call the undersigned attorney.

Respectfully submitted,

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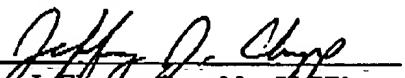

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